

ATOMIC ENERGY *newsletter*®

A SERVICE FOR INDUSTRY BUSINESS ENGINEERING AND RESEARCH
ROBERT M. SHERMAN, EDITOR. PUBLISHED BI-WEEKLY BY ATOMIC ENERGY NEWS CO., 1000 SIXTH AVENUE, NEW YORK 18, N. Y.

Dear Sir:

November 2nd, 1954
Vol. 12... No. 6

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A contract for construction of a gamma irradiation facility building in the Materials Testing Reactor area of the National Reactor Testing Station (Arco, Idaho) has now been awarded Arrington Construction Co., Idaho Falls, low bidder on the job. The irradiation facility will employ used fuel elements from the MTR as a source of gamma rays. With these elements, gamma fields of the order of 10,000,000 roentgens per hour can be made available--more intense than any other known source. (Other BUSINESS news, page 2 this LETTER.)

A new five year contract with the USAEC has now been signed by Climax Uranium Co. (subsidiary of Climax Molybdenum) to double the capacity of the uranium processing mill at Grand Junction, Colo., which Climax operates for the USAEC. Engineering work on the additional facilities is so far advanced that construction will begin at once, and it is expected that the expanded facilities will be in operation within nine months. This is the latest effort to increase the milling capacity for uranium ores in the Western states to cope with the constantly expanding output of uranium ores in that area. Other recent expansions were at the Vitro plant in Salt Lake City; at the Anaconda plant at Bluewater, N.M.; and at the Vanadium Corp.'s plant at Durango, Colo. (Other RAW MATERIALS news, page 5 this LETTER.)

The application of nuclear power to commercial ship propulsion will now be studied by Bethlehem Steel Co.'s shipbuilding division under a recently-approved proposal made by the firm to the USAEC. Bethlehem has been associated with development of machinery for the nuclear-propelled submarines Nautilus and Sea Wolf through its central technical department at Quincy, Mass., which will make this new study. The work will consist of preliminary studies of reactor types, steam cycles, control methods, machinery arrangements, and weight. The company also will explore the development of a package reactor plant for small land-based electric power stations or for distilling plants to provide fresh water in remote regions.

An eleven page study: "Industrial Participation in Atomic Energy Development", is now available on request from Council for Technological Advancement, 120 So. La Salle St., Chicago 5, Ill. The study shows that private industry can be expected to take an increasingly important part in atomic energy work. (Other BOOK & PAMPHLET news, page 3 this LETTER.)

A two day symposium: "The Nuclear Reactor and the University", will be given Nov. 12-13 by Vanderbilt University (at its campus in Nashville) in cooperation with the National Laboratory and the Institute of Nuclear Studies at Oak Ridge.

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BUSINESS NEWS...in the nuclear energy field...

INTEREST IN NUCLEAR FIRM BOUGHT BY NEW YORK CO.:- What it terms "a substantial interest" has now been acquired in the St. Louis firm of Nuclear Consultants, Inc., (formerly Nuclear Research & Development, Inc.) by TelAutograph Corp., New York. The action coincides with the change in its firm name by Nuclear Research & Development, Inc., and the formation by Nuclear Consultants of an instrument division, to be known as NRD Instrument Co. According to Louis R. Kurtin, TelAutograph chairman, all of Nuclear's instrument production will be done at the main TelAutograph plant in New York, while the research and consulting work will continue to be done at Nuclear's laboratories. R.R. Buntaine, formerly general sales manager of Nuclear Instrument & Chemical Corp., Chicago, will now direct the selling activities of NRD Instrument Co.

CHANGES BEING MADE IN INDUSTRIAL ATOMIC POWER PROJECT:- Dow Chemical Co. is now seeking USAEC approval to withdraw from the industrial atomic power development project begun by Dow and Detroit Edison Co. in 1951. The group has also asked the USAEC to approve the addition of nine more companies to its membership, which would bring the total to 34, and to change the project's name to Atomic Power Development Associates. (This original Dow-Detroit Edison group was the first to participate in the USAEC's research program to seek industrial uses of atomic energy. Member concerns have invested or committed \$4,000,000 of their own funds in the project.) Discussing Dow's plan to leave the project, Leland I. Doan, its president said the studies had now reached the stage where the participating companies "had crystallized their individual interests", and that Dow would now follow its own nuclear research program. "In our case", he explained, "we are primarily interested in the chemical aspects of atomic power and the possible utilization of nuclear reactor by-products in the chemical industry. From this point on it is not logical for us to continue participating in a program directed at the development of atomic power as such". Commenting on these changes, Walker L. Cisler, president, Detroit Edison, and chairman of the project management committee, said that the group's efforts must be directed toward developing atomic energy for the generation of electricity at the earliest possible date.

NUCLEAR ENERGY-GENERATED ELECTRICITY FOR BRITAIN SHORTLY:- Approximately 100,000 kw. of electrical energy, produced with nuclear energy as the heat source, will be available in Great Britain for industrial and domestic use within the next two years, T. E. Allibone, director of the central research laboratory of Britain's largest power combine, said in New York last fortnight. Dr. Allibone, who addressed the seventh annual Gaseous Electronics Conference, observed that electrical energy from nuclear sources was essential to Britain's well being in view of that country's critical depletion of coal reserves. Commenting on Dr. Allibone's prediction, Lyle Borst, chairman of the physics department of New York University (co-sponsors of the conference, with the American Physical Society) said this indicated that Great Britain was prepared to produce electrical energy by nuclear means twice as quickly as the latest estimates for production in the United States.

NEW NUCLEAR POWER STUDY TO BE MADE:- A newly formed association of nine companies, known as the Rocky Mountain Nuclear Power Study Group, has now obtained authorization from the USAEC to study (at its own expense) the economic and engineering possibility of a nuclear power reactor for the western United States. This study (the sixteenth currently authorized under the USAEC's industrial participation program) will be a combined project of: Arizona Public Service, Phoenix; Ebasco Services, New York; Fluor Corp., Los Angeles; Idaho Power, Boise; Minnesota Mining & Manufacturing, St. Paul; Phillips Petroleum, Bartlesville, Okla.; Public Service of Colo., Denver; Riley Stoker, Worcester, Mass.; Utah Power & Light, Salt Lake City. The group will first study the feasibility of a reactor, cooled and moderated by light water, fueled with slightly enriched uranium, and designed for the purpose of producing both power and fissionable material. The group will then investigate the economic feasibility of other reactor types. The companies will assign ten full-time employees to the study. In addition, each company will contribute \$5,000 to defray the costs. The agreement is for one year, at the end of which the group will report its findings to the USAEC and make recommendations on the practical applications of atomic power and the role of industry in carrying out these applications.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

FROM THE MANUFACTURERS:- Scintillation counter, model SC-10; for airborne and ground exploration for uranium. With a count rate range of 1000; 2000; 20,000; and 40,000 counts per second, full scale, this instrument is said by the manufacturer to have a sensitivity of better than 100 counts per second per microroentgen per hour. Time constants are 0.1; 1.0; and 10.0 seconds. --Sherwin Instrument Co., Inc., New York 25, N.Y.

NOTES: A new type of pocket-sized radiation indicator, which detects fast neutrons, has been developed at the atomic energy project of the University of California at Los Angeles. This new dosimeter, which is an improvement of a previous model designed by George Taplin and associates, at the project, detects various levels of radiation by changes in the color of a dye. These dyes react almost the same as tissue juices in the body in the absorption of X-and gamma-rays. They also have a uniform sensitivity to such radiations regardless of penetrating power. The instrument holds three or more vials filled with a dye solution of aqueous phenol red saturated with trichloroethylene which turns yellow when exposed to radiation. Vials may be set to turn color at different doses of radiation ranging all the way from 25 roentgen units up to hundreds of such units.

Work now being done at Brookhaven National Laboratory with a naturally occurring clay known as montmorillonite is now regarded by the USAEC as the most hopeful approach to the disposal problem of radioactive waste materials so far devised. Under the direction of L. P. Hatch, a research team at Brookhaven has investigated various ways of incorporating such wastes into the crystalline structure of the clay: the physical chemistry involved had been studied by Henry C. Thomas, Yale University. The procedure is to shred the clay into filaments, and then to pack it into cylinders. A column is formed by placing the cylinders end to end and the liquid wastes are circulated through the column. The clay is then baked in a kiln; in this final ceramic form, it can be handled easily.

NEW BOOKS & OTHER PUBLICATIONS...in various nuclear fields...

INDUSTRY & RESEARCH:- Protection Against Radiations from Radium, Cobalt-60, and Cesium-137. Handbook 54, National Bureau of Standards. Prepared by National Committee on Radiation Protection, and is a revision of the radium protection code of NBS Handbook 23 (25¢).....Permissible Dose from External Sources of Ionizing Radiation. Handbook 59, NBS. Recommendations and discussions of permissible dose contained in this handbook form the basis of all other recommendations of the Nat. Committee on Radiation Protection. (30¢)--Superintendent of Documents, Wash. 25, D.C.

Handling & Dispensing of Chemically Processed Radioactive Isotopes. A report of Britain's Atomic Energy Research Establishment. 24 pages. (90¢)--British Information Services, 30 Rockefeller Plaza, New York 20.

Beta Ray Ionization Intensity of Potassium, Uranium, and Thorium. A study (at Fordham University's physics department) of such ionization from naturally radioactive potassium salts, and uranium and thorium ores. (Microfilm \$3.25; photocopy \$9.00)--Library of Congress, Publication Bd. Proj., Wash. 25, D. C.

FINANCIAL:- Financial analyses, by New York City brokerage houses, and available on request from them, have been made of these firms active in nuclear energy work: Climax Molybdenum (Fahnestock & Co., 65 Broadway); Babcock & Wilcox (Walston & Co., 55 Wall St.); Atlas Corp. (Pennington, Colket & Co., 70 Pine St.); General Electric, Westinghouse, Minnesota Mining, and others (Ralph E. Samuel & Co., 115 Broadway).

IN THE EDUCATIONAL FIELD...activities in nuclear work...

Research:- A grant to Iowa State College of \$12,000 by Dow Chemical Co., has been used to establish two fellowships in the College's Institute for Atomic Research. The grant, for fundamental thermodynamic studies of metals and their salts, will enable more basic information to be known about materials used in nuclear reactor construction.

University faculty members, through the Oak Ridge Research Participation Program, may conduct research in Oak Ridge for periods of 3-months to a year, with payment to the person on leave for such research approximating his university salary. Information available from: Oak Ridge Institute of Nuclear Studies, P.O. Box 117, Oak Ridge, Tenn.

ATOMIC OPPORTUNITIES: Selected portions (dealing with atomic energy) of an address, under the title "Atomic Opportunities in New England", by Lewis L. Strauss, Chairman, USAEC, before the New England Council, Boston, Mass., Oct. 20th, 1954.

Economic studies by the USAEC and its contractors convince us that the production of electricity from nuclear fuel will, within the next decade or two, be at least competitive with electricity from conventional fuels. The (USAEC'S) now well known 5-year reactor development program, at a total cost of about \$200,000,000, provides for the completion of five reactors at the rate of one reactor a year, each reactor representing a different approach to the goal of obtaining economic electric power: pressurized water reactor; sodium graphite reactor; boiling water reactor; fast breeder reactor; and the homogeneous reactor. Of course, even though our maximum effort is being put into the 5-year program, many other reactor concepts, such as the liquid metal fuel reactor and the gas coolant reactor, have their advocates and warrant investigation. And besides all of this, we are pressing ahead with vigorous programs developing specialized power reactors to propel ships and aircraft for the armed forces.

We are also carefully examining the possibilities of useful applications of the considerable energy contained in waste fission products (resulting from reactor operations). Our early concern with this waste was its disposal. Now, the immediate purpose of the present program is to develop uses for their high intensity gamma radiation. There is reason to hope that the monetary return from such applications will offset the costs of storage in tanks or other disposal.

For example, at Brookhaven National Laboratory there has been developed, to the pilot plant stage, an interesting system for fixing or immobilizing these radioactive materials on cheap, natural clays. This not only promises better ways of ultimately disposing of wastes, if that has to be done, but also may represent a practical way of packaging the radioactive materials as useful sources of energy. (Page 3 this LETTER gives further details this method.)

At present, the two most promising fields of application of this gamma radiation from what was once only a waste product appear to be food preservation and the initiation and promotion of chemical reactions. Last June, the USAEC initiated a cooperative program with the U. S. Army in which the Army supports food technology and the USAEC supports radiation technology. Major emphasis is on the ultimate achievement of complete food sterilization using gamma rays.

It has been demonstrated that the shelf life of pre-packaged meat products can now be increased from 3 to nearly 21 days using mild gamma ray pasteurization doses. Studies show that a plant could be built for some \$600,000, financed with 6% money, and amortized in 5 years, charging such costs off at the rate of $\frac{1}{4}$ ¢ per pound of the irradiated product.

Potatoes, exposed to a mild dose of gamma radiation and which are then held at a storage temperature of 50 deg. F., exhibit such an increased shelf life that there is no evidence of spoilage or sprouting for periods up to two years. The design of a radiation facility, using two materials-testing-reactor-fuel elements as a radiation source, is now being considered. Such a facility, which would be capable of irradiating up to 20 tons of potatoes per hour, could probably be built at a cost of less than \$50,000. Using these figures, farmers might irradiate truck loads of potatoes in a few minutes per load at a cost of just a few dollars.

An example of the value of gamma radiation in the chemical industry is in connection with the manufacture of the insecticide benzene hexachloride. This product is now made by using ultraviolet light as a catalyst. Since ultraviolet light does not penetrate deeply, elaborate mixing equipment is required. The same results have been obtained by passing chlorine through benzene in the presence of gamma radiation at normal atmospheric pressure and room temperature.

Although this program (parts of which I have described) was originated to find uses for gross fission products, other possibilities are beginning to appear economically and technically feasible. The extraction of radioactive xenon and krypton gases from certain type reactor cores (to name one) appears practical.

RAW MATERIALS...prospecting, mining, & marketing...

UNITED STATES: Colorado- A uranium prospecting rush was underway in the last fortnight in Routt, Rio Blanco, and Moffat counties in this state. Most of the uranium ore has proved to be of low grade, but reports from the area were that this low quality ore was extensive enough to make mining of such low grade lodes a profitable venture.....Acme Uranium Mines, Inc., Grand Junction, has now bought, for some \$125,000 cash plus ore royalties and stock, some four producing claims from Maley Mining Co., Dove Creek. The property, located in the Circle Cliffs area of Garfield County, Utah, has been producing high grade ores since it was started. Acme estimated that its production from the property will be some 1,000 tons per month of ore valued at \$50 per ton.....Nuclear Exploration Corp., United States subsidiary of Nuclear Explorations, Ltd. (Canada), is now conducting preliminary stripping work on its Cedar claims, in the Juniper Springs area near Craig. A program of diamond drilling is planned for the property, according to J.R. Woolgar, president of the firms.

CANADA: An option has now been obtained by Northland Mines on a uranium discovery which it terms "promising" in a brand new area located some 20 miles south of the Marian River field in the Northwest Territories. Values averaging about 0.5% uranium oxide across widths that range from 5.0-ft. to 20-ft., have been found, an official of the company states. The property, which is known as the Sun group, was acquired for \$150,000 and 300,000 shares of the proposed new company, Consolidated Northland Mines. Some 16 claims, totalling 800 acres make up the ground being optioned.....All its activities are being concentrated by Baska Uranium Mines, Ltd., on two of the groups it holds in the Beaverlodge area, Lake Athabaska, in North Saskatchewan, the company reports. On its Fredette group, a new showing is being opened up where intense radioactivity has been shown over a length of 100-ft. Work is also getting under way on its group near the west end of Tazin Lake.

NUCLEAR WORK ABROAD...

Great Britain: At Britain's first heavy water nuclear reactor, ("Dimple"), which is now in operation at the Atomic Energy Research Establishment (Harwell), experimental work is now under way on E.443, the new and more powerful nuclear reactor now being built at Harwell. This deuterium moderated pile of low energy (Dimple) utilizes a moderator of heavy water contained in a tank which is surrounded by a graphite neutron reflector. Outside this is a concrete radiation shield. The reactor fuel is submerged in the heavy water, and both the type of fuel and its arrangement in the tank can be changed quickly. This thermal neutron reactor will permit the behaviour of a wide variety of design to be investigated experimentally in a relatively short time. (The work at Harwell, since this past August 1st, is being supervised by the United Kingdom Atomic Energy Authority. The authority, a statutory corporation, which has the responsibility for atomic energy research and development in Britain, has, in addition to Harwell, supervision and control of the atomic energy establishments at Amersham, Aldermaston, Risley, Springfields, Sellafield, and Capenhurst, as well as the new projects at Calder Hall and Dounreay. The Ministry of Supply, which originally handled all atomic energy work in Britain, continues to be responsible for supplying atomic weapons to the Armed Services, and places contracts with the Authority for producing nuclear components of these weapons and related research. The Authority is, however, free to engage in experimental work on improved atomic weapons.)

The United Kingdom and the New Zealand Governments are proceeding with a project for producing heavy water and power from geo-thermal steam in the Wairakei District of North Island. It is intended that the heavy water will be used in nuclear reactors. (This project, which had been under consideration last year, had been put in abeyance on economic grounds. However, Britain's increasing need for heavy water, and generally improved economic state, provided the incentive for the reconsideration this year of the project.)

Sincerely,

The Staff,
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